



THE 1994 NATIONAL CENSUS OF PINK-FOOTED AND GREYLAG GEESE IN BRITAIN

Carl Mitchell & Richard Hearn

Research Department,
The Wildfowl & Wetlands Trust
Slimbridge, Gloucester, GL2 7BT, U.K.

SUMMARY

The 35th consecutive census of Pink-footed and Greylag Geese in Britain took place in autumn and early winter 1994. Two discrete counts were undertaken, recording maxima of 260,486 Pink-footed Geese in October and 86,132 Greylag Geese in November.

The Pink-footed Goose total represents a 16% increase compared with 1993, whilst the Greylag Goose population estimate has fallen by 14% compared to the previous year. Both species bred reasonably well in 1994 with 22.2% and 23.2% young, and brood sizes of 2.52 and 2.34 young/pair for Pink-footed and Greylag Geese respectively.

The October counts are believed to accurately reflect the population of Pink-footed Geese due to excellent coverage and co-ordination and good counting conditions. However, poor counting conditions in November, together with a late arrival of Greylag Geese from Iceland meant the estimate for Greylags is probably smaller than the true winter population. We suggest estimates of 260,000 Pink-footed and 86,000 Greylag Geese, whilst acknowledging that the Greylag estimate is probably an underestimate. Regional distribution of the birds and the importance of key sites are discussed.

This report provides a brief overview of the results of this census; more detailed information on individual regions or sites is available from WWT on request.

INTRODUCTION AND METHODS

The 35th consecutive national census of Pink-footed Geese *Anser brachyrhynchus* and Greylag Geese *Anser anser* was conducted in autumn and early winter 1994. The methods followed previous years with, as in 1990 to 1993, two discrete counts being made, one in October when Pinkfeet tend to be more concentrated at fewer sites, and one in November when it is hoped that Greylags have completed their migration from Iceland. The majority of observations were conducted by volunteers, usually made as dawn or dusk counts at known roost sites, although in a very few areas, where the locations of roost sites were poorly known, daytime counts of feeding birds were made. Assessments of the number of young present in autumn flocks and the average brood size per family were made by experienced counters at a number of sites in Scotland during the period 1 October through to 15 November.

WEATHER CONDITIONS AND COVERAGE

Counts made on 8/9 October were generally good with high cloud and little wind reported from many areas, particularly in the north, although a few showers occurred in east Scotland. The weather in November was mixed for goose counting, with a dull overcast day reported from most localities. Isolated mist and fog patches amongst the rain were reported locally from a number of sites. For example, thick mist at *Loch Mahaick*, Stirling meant c.2,000 Pinkfeet were not located which had been roosting there every night for the previous two weeks. The full moon was on 19 October and 18 November - thus having little effect on counts for both months. There were only a few reports of night feeding where birds may have roosted on fields rather than flying to lochs.

A total of 137 sites was covered by the census representing a slight decrease on the coverage in 1993 although, once again, it is reassuring to note that all of the important sites were covered (see '*principal concentrations*' below). There were several sites where counts were not accurate, caused by a number of reasons, notably locally poor weather. However, these probably affected November estimates more than the October counts. Nine sites were counted in November but not in October and eight sites were covered in October but not in November. These tended to be sites which regularly support only a few hundred birds, the main exceptions being: Sites in the *Upper Tay*, Perth & Kinross which held 2,030 Greylags in November and *Lower Bogrotten*, Moray which held 5,180 Greylags in November - missing counts in October from these two sites will thus have contributed to a low overall count in October. The only principal sites which have been covered in previous years but not counted in either the October or November 1994 counts were; *Loch of Tankerness*, Orkney (although these birds were probably counted feeding on the 'east Mainland') and *Endrick Mouth*, Central which can support up to 500-750 Greylags.

Some supplementary September and early October counts showed an early arrival of Pinkfeet (*e.g. Dupplin Loch*, Perth & Kinross supported 62,000+ on 2 October; *Loch of Strathbeg* held 58,150 on 30 September). Hopefully, these passage birds were picked up further south.

In summary, the weather was surprisingly good for goose counting in October and together with good coverage this surely assisted in obtaining as accurate a population estimates as was possible for Pinkfeet. However poor weather and a slight reduction in the number of sites covered for the November counts will have affected the Greylag population estimate.

RESULTS

TOTAL NUMBERS

Pink-footed Geese

The count of 260,486 Pink-footed Geese in Britain in October 1994 (Table 1) represented a 16% increase compared with October 1993. The estimated population (260,000) was higher than that recorded in 1991 (232,000) and is the highest ever recorded in Britain. The count for November 1994 (183,284) was 6% lower than the corresponding total counted in November 1993 (194,957). In October, there were few suggestions that birds had been missed, and in view of the large numbers of sites covered and good weather, it seems likely that the number is close to the true population size.

The 1994 counts reveal a reduction between October and November - an apparent loss of c.77,000 birds (30%), twice the value recorded in both 1992 and 1993. No major Pinkfoot roosts were missed in November, thus re-enforcing the suggestion by Newton *et al.* (1990) that a more accurate estimate of the Pink-footed Geese population can be obtained in October before birds start to disperse more widely within Britain (Figures 2a & 2b). The difference is remarkable however, and poses two further questions: If most of the major roosts are covered, where are the 'missing' 77,000 birds? and secondly, if the October counts give a much better

Table 1. *The numbers of Pink-footed and Greylag Geese recorded in Great Britain in October and November 1994. The number of sites counted is also given.*

DISTRICT/REGION	OCTOBER			NOVEMBER		
	Sites	Pinkfeet	Greylag	Sites	Pinkfeet	Greylag
Shetland	nc			nc		
Orkney	7	14	1,331	7	3	2,702
Western Isles	1	0	65	1	0	0
Caithness	+	50	5,563	+	0	4,175
Sutherland	3	56	616	3	0	1,917
Ross & Cromarty	4	124	12,014	4	250	10,180
Inverness/Nairn	2	0	100	3	0	2,510
Badenoch & Strathspey	1	2	30	1	9	1,418
Moray	3	15	3,254	4	20	10,610
Banff & Buchan	1	52,700	70	1	21,500	120
Gordon/Aberdeen	3	6,087	5,983	3	5,150	8,103
Kincardine & Deeside	1	0	709	1	168	20,641
Angus/Dundee	5	27,150	1,298	6	20,855	983
Perth & Kinross	21	85,285	2,196	18	42,827	9,524
Central	5	2,613	121	5	2,237	587
Fife	17	3,983	324	17	3,902	1,457
Argyll & Bute	4	3	807	4	0	1234
Glasgow area *	1	0	0	1	0	0
Clydesdale	2	4,651	53	2	5,057	156
Stewartry/Wigtown	4	0	1,242	6	0	2,725
Annan & Eskdale/Nithsdale **	2	1	10	2	0	0
East/Midlothian	13	13,013	550	13	13,315	1,657
Edinburgh/West Lothian	1	0	160	1	0	220
West Borders (Tweeddale)	3	26,500	0	3	14,700	0
East Borders ***	6	8,319	2,628	6	8,411	1,799
NE England	8	901	813	8	1,122	3,153
Cumbria **	3	0	638	3	0	260
Lancashire and Merseyside	+	26,770	0	+	28,085	0
Lincolnshire	4	32	0	3	8	0
Norfolk	4	2,215	0	4	15,695	1
TOTAL	126	260,486	40,575	127	183,314	86,132

* includes Bearsden & Milngavie, Clydebank, Cumbernauld & Kilsyth, Cumnock & Doon Valley, Dumbarton, East Kilbride, Eastwood, Glasgow City, Hamilton, Inverclyde, Kilmarnock & Loudoun, Kyle & Carrick, Monklands, Motherwell, Renfrew and Strathkelvin.

** for convenience, counts from the Solway Firth are included in the Annandale & Eskdale/Nithsdale total even though some birds roost and feed on the Cumbrian side of the estuary.

*** includes Ettrick & Lauderdale, Roxburgh and Berwickshire.

+ - Several sites consolidated nc - no count received

population estimate than the November counts, how accurate were the traditional November counts carried out up to 1990?

Greylag Geese

The count of 86,132 Greylag Geese in Britain in November 1994 is 15% lower than the population estimates for both 1993 and 1992 (c. 100,000). Between 1985 and 1993 the population estimate was just over 100,000 but included two major 'dips' in the counts: in 1989, the November estimate was 83,500; in 1991 the estimate was 88,000. In 1989, the estimate was considered too low and was largely attributed to poor weather during the census, however, in 1991 counting conditions were generally good and the suggestion was made that had indeed been a reduction in the overall population (Cranswick & Kirby 1992).

There were several sites where counts of Greylags may not have referred to Icelandic birds (See Discussion in Mitchell & Cranswick 1993). However, these inaccuracies do not affect the November population estimate greatly - for example: 800 Greylags roosting at the *Sranraer Lochs*, Wigtownshire (feral); 30 at *Milton Loch*, Stewartry (possibly feral); 195 at *Low House*, Armathwaite and 225 at *Helton*, Penrith (considered feral); and 31 at Brownrigg, East Lothian (feral). In all cases the numbers of feral or re-introduced Greylags is small but these flocks can be augmented by winter visitors, thus confusing the picture. A revised population estimate is therefore nearer 86,000.

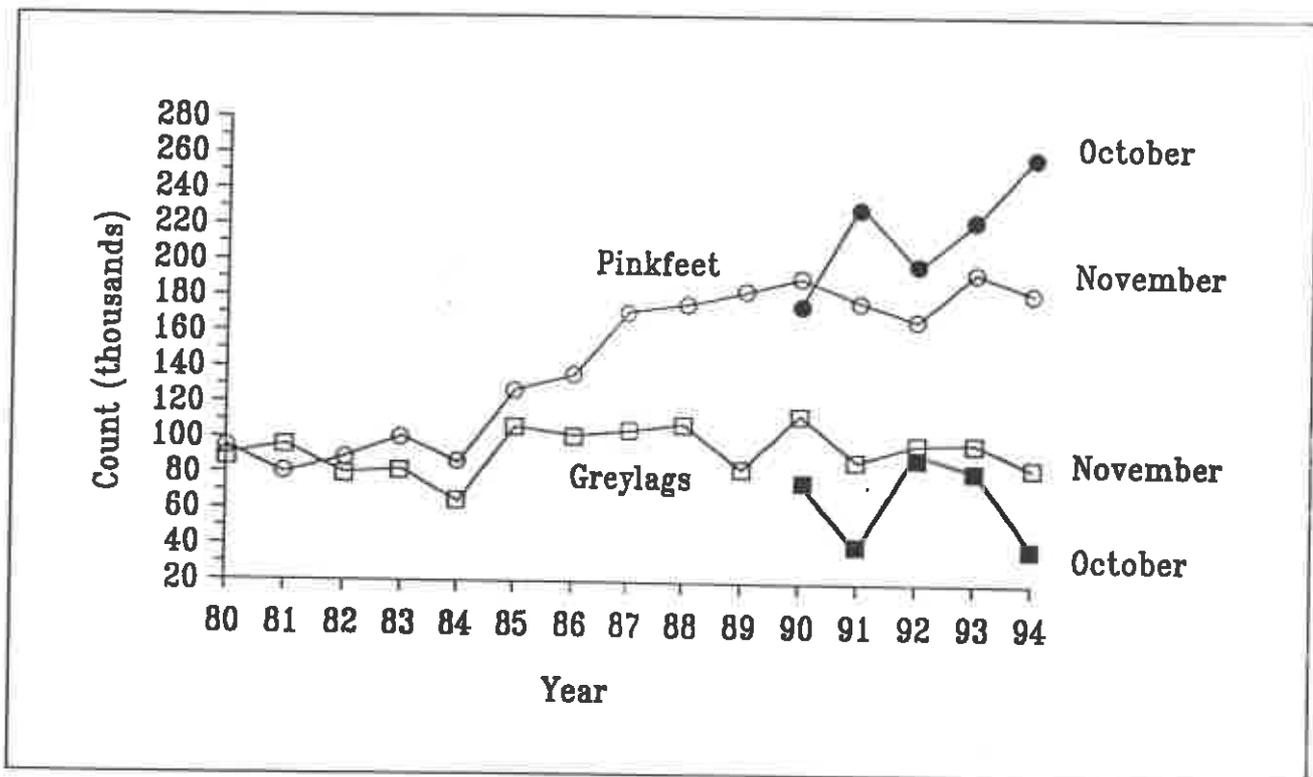


Figure 1. The numbers of Pink-footed Geese (circles) and Greylag Geese (squares) recorded by WWT counts in November (open symbols) and, since 1990, in October (closed symbols), 1980-1993.

REGIONAL DISTRIBUTION WITHIN BRITAIN

The distribution of Pink-footed and Greylag Geese by region/district in October and November 1994 is shown in Table 1, whilst Table 2 shows the gross regional distribution of geese. Table 3 shows the principal resorts of both species and Figure 2 shows distribution maps of counts.

Pink-footed Geese

In October, the majority of birds (46%) were recorded in East-central Scotland (Tayside, Central and Fife). Just under a quarter was found in North-east Scotland (eastern Grampian) and about a fifth of the total was in South-east Scotland/North-east England (Lothians, Borders and Northumberland), a pattern similar to 1993 and 1992. By November there was, as expected, a movement south with, for example, increases in East England (Norfolk). Pinkfeet had arrived in Lancashire earlier than in some previous years: nearly 27,000 were counted there in the second week of October. Note, too, the rapid movement of birds through East-central Scotland: in 1994, a decrease from 115,000 birds in October to 70,000 by November.

Greylag Geese

In 1994, the October and November counts revealed the late arrival of Greylags in their wintering quarters with a 43% increase between the two months. Notable concentrations in October 1994 were found in North Scotland (principally Highland Region), which accounted for 23% of the population, with few birds reported from more southerly areas. By November, the groups were a little more dispersed, North Scotland accounting for 27% of the population whilst North-east Scotland now supported 46% - marked increases in numbers occurring in Moray and Kincardine & Deeside. In other areas the counts for October and November were similar.

Table 2. Gross regional distribution of Pink-footed and Greylag Geese in Britain in October and November 1994, expressed as a percentage of the maximum count for each species.

Area *	Pink-footed Goose		Greylag Goose	
	Oct	Nov	Oct	Nov
North Scotland	0.1	0.1	23.1	26.8
North-east Scotland	22.5	10.3	11.8	46.3
East-central Scotland	45.7	26.8	4.6	14.7
South-east Scotland/North-east England	18.7	14.4	4.9	8.0
South-west Scotland/North-west England	1.8	1.9	2.7	4.1
West England	10.3	10.8	0.0	0.0
East England	0.9	6.0	0.0	0.1
Total	100.0	70.3	46.7	100.0

* areas are defined as follows:

North Scotland: Shetland, Orkney, Western Isles, Highland

North-east Scotland: Grampian

East-central Scotland: Tayside, Central, Fife

South-east Scotland/North-east England: Lothian, Borders, Northumberland

South-west Scotland/North-west England: Strathclyde, Dumfries & Galloway, Cumbria

West England: Lancashire, Merseyside

East England: Humberside, Lincolnshire, Norfolk

Figure 2a. The location of Pink-footed Geese on census dates in autumn 1994

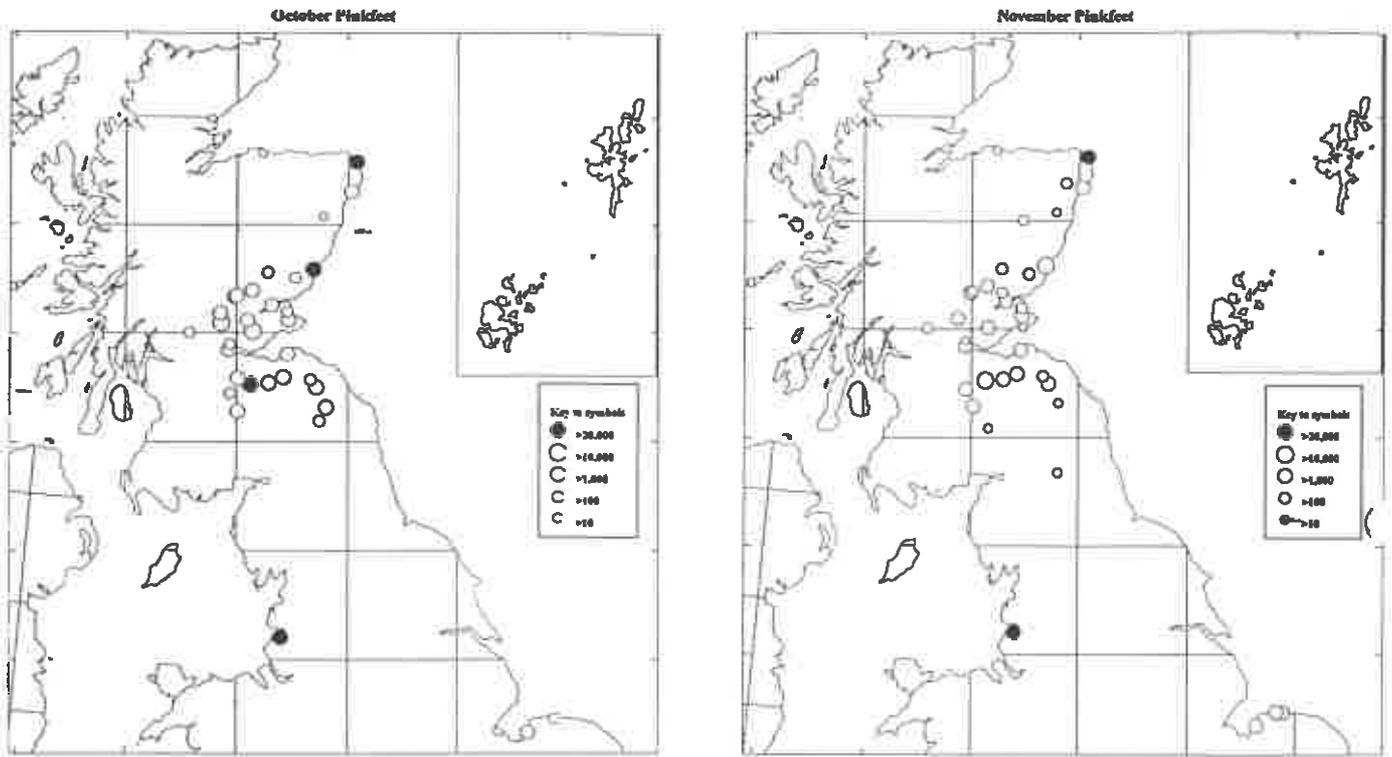


Figure 2b. The location of Greylag Geese on census dates in autumn 1994

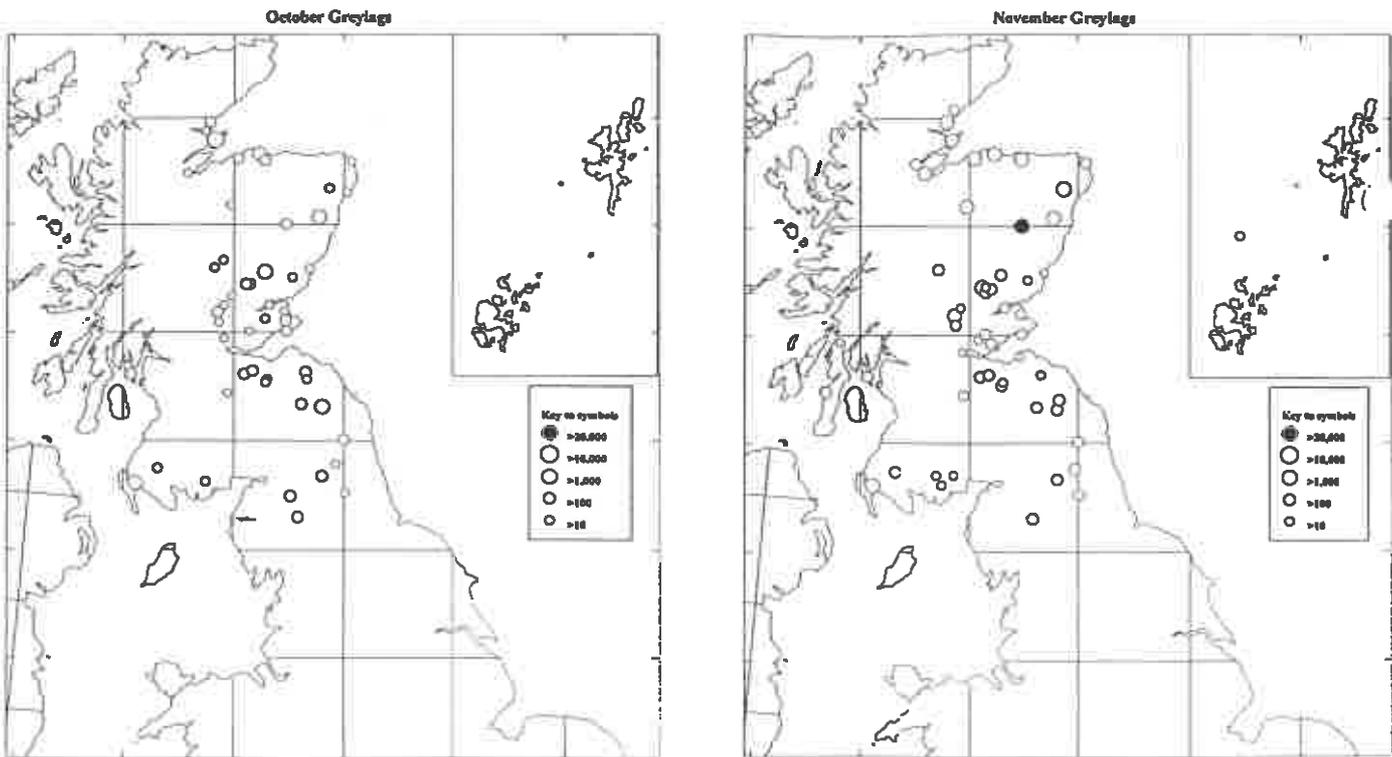


Table 3. Principal Pink-footed and Greylag Goose resorts counted in Autumn 1994. Columns show all counts from the top ten sites for each species (A,D), the site count as a proportion of census totals (B,E), and the site count as proportion of average winter maxima from the previous five autumns (C,F). Five year peak mean counts (G) are calculated using all monthly counts (WeBS data) and *ad hoc* counts, thus these may appear larger than counts recorded in the autumn.

PINKFEET

Census Total	OCTOBER			NOVEMBER				G
	A	B	C	D	E	F		
Loch of Strathbeg	52,700	20.2	162	21,500	11.7	66	32,444	
Dupplin Loch	34,000	13.0	88	21,500	11.7	56	38,500	
South West Lancs/Merseyside	26,770	10.3	81	28,085	15.3	85	33,116	
West Water Reservoir	26,500	10.2	84	14,700	8.0	46	31,717	
Montrose Basin	23,200	8.9	90	20,000	10.9	78	25,642	
Loch Leven	16,154	6.2	83	9,800	5.3	50	19,550	
Carsebreck Lochs/Strathallan	14,500	5.6	159	5,150	2.8	57	9,094	
Glenfarg Reservoir	9,080	3.5	281	0	0.0	0	3,227	
Meikle Loch, Slains	6,060	2.3	34	4,820	2.6	27	17,933	
Hule Moss	5,620	2.2	31	8,100	4.4	44	18,194	

GREYLAGS

Census Total	OCTOBER			NOVEMBER				G
	A	B	C	D	E	F		
Dinnet Lochs	709	1.7	4	20,641	24.0	104	19,804	
Loch Eye/Inner Cromarty Firth	11,714	28.9	79	9,207	10.7	62	14,842	
Loch of Skene	5,923	14.6	45	6,203	7.2	47	13,171	
Lower Bogrotten	-	-	-	5,180	6.0	184	2,818	
Loch Spynie	2,550	6.3	45	4,200	4.9	74	5,666	
Caithness	5,563	13.7	124	4,175	4.9	93	4,494	
Drummond Loch	800	2.0	25	3,430	4.0	105	3,258	
Orkney	1,331	3.3	32	2,702	3.2	65	4,188	
Beaully Firth	100	0.2	2	2,510	2.9	39	6,473	
Stranraer Lochs	1,200	3.0	43	2,500	2.9	90	2,788	

A - October site count

B - Site count as a percentage of October census

C - October site count as a percentage of 5 year mean (G)

D - November site count

E - Site count as a percentage of November census

F - November site count as a percentage of 5 year mean (G)

G - 5 Year peak mean (from Waters & Cranswick 1994)

PRINCIPAL CONCENTRATIONS

Pink-footed Geese

Over 62% of the October total was found at only five sites: *Loch of Strathbeg*, Banff & Buchan (52,700); *Dupplin Loch*, Perthshire (34,000); roosts in *South-west Lancashire* (26,770); *West Water Reservoir*, Tweeddale (26,500) and *Montrose Basin*, Angus (23,200) (see Table 3). *Loch of Strathbeg* alone accounted for 20% of the October total. Overall, seven sites held more than 10,000 Pinkfeet, a further 19 sites held over 1,000, thus only 26 sites accounted for 99% of the October count. A further seven sites held over 10 Pinkfeet.

A similar pattern was reported a month later with 58% of the November count found at only five sites (surprisingly the same sites as October): *South-west Lancashire* (28,085); *Loch of Strathbeg*, (21,500); *Dupplin Loch*, (21,500); *Montrose Basin*, (20,000) and *West Water Reservoir*, (14,700). In all, Pink-footed Geese were recorded at 62 sites either in October or November (Figure 2a).

Among other autumn counts received, notable maxima away from the census dates included: 62,000+ at *Dupplin Loch* (2 October, and 45,000 there on 25 September); 58,150 at *Loch of Strathbeg* (30 September); and 31,038 at Snettisham, Norfolk (27 December). The 2 October count at Dupplin Loch was considered an underestimate by the counter but still represents the largest gathering of Pinkfeet in Britain ever (Dr. M. Bell *in litt.*)

Greylag Geese

In November, 51% of the total was found at only five sites: *Dinnet Lochs*, Grampian (20,641); *Loch Eye*, Highland (7,107); *Loch of Skene*, Grampian (6,203); *Lower Bogrotten*, Grampian (5,180) and *Loch Spynie*, Grampian (4,200). Overall, 19 sites held more than 1,000 birds and a further 37 sites held between one and 1,000 birds demonstrating the dispersed nature of this species when compared to Pinkfeet.

In all, Greylag Geese were recorded at 74 sites in either October or November (Figure 2b) - a figure 33% lower than that recorded in 1993. In addition to the census counts, the following counts were recorded: 33,119 (31 October) and 30,359 (8 November) at *Dinnet Lochs* (note, however, that the census count recorded only 20,641 on 13 November); 8,500 at *Loch of Skene* on 5 December and 7,000 at *Loch Spynie* on 6 November.

BREEDING SUCCESS

Pink-footed Geese

A total of nearly 16,000 Pink-footed Geese was aged at various localities in Scotland during October and November. Breeding success was reasonably good with 22.2% young observed in sample flocks and mean brood size (2.52) was just above average (Table 4).

Greylag Geese

Fewer data were received for Greylag Geese than Pinkfeet and these were from Scotland during October and November. Greylag breeding success was also reasonable in 1993, with 23.2% young observed in sample flocks and the mean brood size (2.34) was just above average (Table 4). Greylags in 1994 produced a slightly higher proportion of young than Pinkfeet.

Additional data were received for both species from flock scans made after this time. These data have not been included in the analysis above in order to maintain continuity with previous years, however the data

collected (e.g. by David Patterson) will form part of a larger analysis investigating brood size changes during the winter months and into the spring.

Regional variation in the proportion of young recorded persists - notably demonstrated by an increase in the proportion of young Pinkfeet in flocks checked further south. No such latitudinal increase was recorded in Greylags; there appears to be a larger proportion of young in more northerly flocks, although small sample sizes in the southern sites does not permit attaching significance to this.

Table 4. The proportion of young and average brood size in Pink-footed and Greylag Goose flocks in autumn and early winter of 1994. (Regions are defined in Table 2)

	Region	Total aged	% Young	no. of broods	Brood size
Pink-footed Goose	North Scotland	500	18.6	27	2.22
	North-east Scotland	4,100	23.0	84	2.56
	East-central Scotland	8,387	20.1	146	2.49
	South-east Scotland/North-east England	500	23.0	9	3.44
	South-west Scotland/North-west England	1,268	23.7	-	-
	West England	1,189	30.6	-	-
	Total	15,944	22.2%	266	2.52
Greylag Goose	North Scotland	3,708	30.5	201	2.32
	North-east Scotland	1,516	19.6	67	2.46
	East-central Scotland	3,253	18.2	52	2.37
	South-east Scotland/North-east England	38	28.9	-	-
	South-west Scotland/North-west England	1,114	18.0	52	2.25
	Total	9,629	23.2%	372	2.34

DISCUSSION

The 1994 October counts, made over a single weekend and in good goose counting conditions, provided an accurate population estimate for Pink-footed Geese. In November conditions had changed; fewer of the less important sites were covered and there were rather poorer counting conditions, consequently a less accurate population estimate for Greylags was obtained. The low count of Pinkfeet in November (a 30% reduction compared with a month before) reflects poorer count conditions overall. However, the 20 or so sites that held Greylags in 1993 but which were not covered in 1994, could account for a further c.3,000.

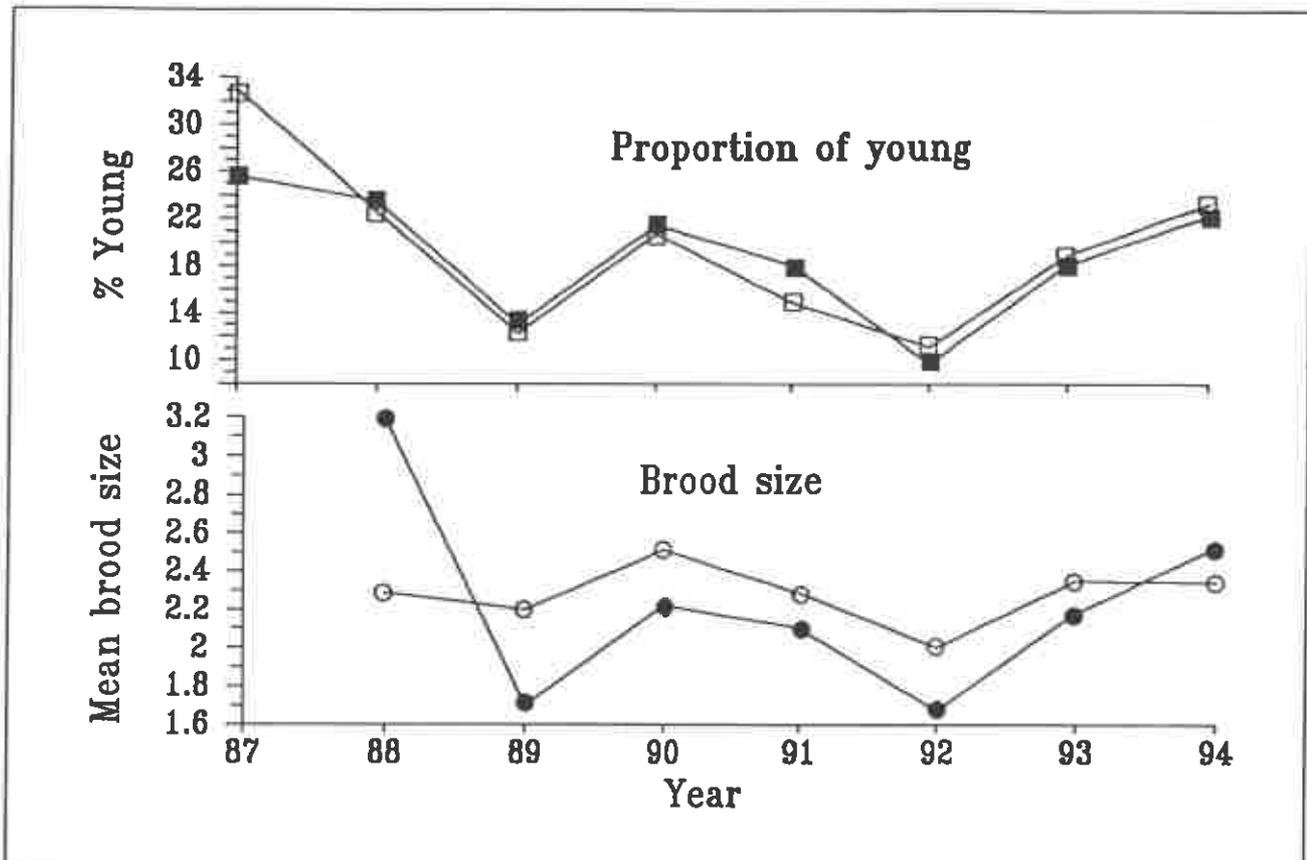


Figure 3. The proportion of young (squares) and average brood size (circles) for Pink-footed Geese (closed symbols) and Greylag Geese (open), recorded by WWT censuses, 1987 to 1994.

The Greylags had also arrived later from Iceland than in 1993 - the October count comprising only 43% of the November population estimate. In 1991, less than 50% of the total had arrived by the first count date (Figure 1). This suggests that in years when Greylags leave the Icelandic summer grounds later than normal certainly the October counts will be very low, but the November counts may also be lower than the true population estimate. Thus, Greylags may be still arriving from Iceland in the second week of November.

Another important aspect to consider is the rather low count at *Dinnet Lochs* in November. The count five days before the census on 8 November was over 30,000; for the next two days bad weather did not permit counts and by the time of the census (12 November) the number roosting there had fallen by nearly 10,000 to 20,641, and, by the following morning to just over 16,000 (an overall reduction of 50%). Thus, in only one week, a third to a half of the roosting Greylags had either moved south from the area (possibly to sites that were not adequately covered), or were roosting locally (on flooded fields or smaller lochs) and were not picked up. Changes in the pattern of roosting behaviour in the order of this magnitude (c. 10,000-15,000 birds) clearly has an impact on trying to estimate the population size. Whilst it is hoped that coverage of all the major roosts in northern Britain would pick up arrivals from *Dinnet Lochs* this cannot be guaranteed, and if the birds had used un-counted temporary roosts on their way to traditional roosts sites the population estimate given may well be short by up to 10,000 birds.

Figure 1 shows the population estimates for the period 1980-94. From 1990, counts have been made in both October and November. Population estimates for Pink-footed Geese have, rightly, been based on the October counts; however, the traditional November population estimates are also shown for comparison. The importance of, and differences between, the October and November counts will become apparent over the coming years. It is encouraging that the October Pinkfoot counts are higher than the later November counts -

they presumably reflect a more accurate population estimate. It is however, interesting to speculate what the true population estimates were for the years up to 1990 if we are now regularly recording up to a 20% decrease in numbers by the time of the November count.

The 1994 population estimate for Pink-footed Geese largely reflects a good breeding season and is larger than the previous highest total of 232,000 in 1991. The situation for Greylag Geese, we can conclude given the counting conditions, remains stable. What is still far from understood, however, is the continued success of the Pinkfoot population in the face of an apparent levelling off in Greylag numbers.

The suggestion, based on the low 1991 (and now 1994) counts, that the number of Greylags wintering in Britain was not increasing, perhaps suffering from intensive hunting pressure at certain sites, may still hold. Limited data from the ringing efforts of Highland Ringing Group (in collaboration with WWT) suggested that a greater proportion of ringed Greylags were shot in autumn 1994 in Iceland than Pinkfeet - clearly this needs further investigation.

Summer 1994 was a good breeding season for both species of grey goose and this was reflected in other Arctic breeding grey geese that wintered in Britain in 1994/95: European White-fronted Geese (23%) and Greenland White-fronted Geese (13%) both appear to have had a reasonable breeding year and certainly much better breeding year than in 1992.

Winter 1994/95 saw the continuation of a study investigating the distribution of grey geese during the winter months and into the spring. Many of the counters involved in the counting of roosts sites in October and November helped with these additional counts. We hope to continue this monitoring in 1995/96 with four roost counts from each site. The autumn counts will continue to feed data into total population and productivity estimates and the winter and spring counts will contribute to our understanding of the distribution and importance of key sites at times other than the autumn.

Ian Stenhouse's report on the first season was finished in summer 1994 and is available from WWT. The report on the second winter will be completed during summer 1995 and copies will be sent to counters in September. For further details please contact CM or RH at Slimbridge.

AUTUMN COUNTS 1995

The dates for the 1995 annual national census of Pink-footed and Greylag Geese have been provisionally set for **14-15 October** and **25-26 November**. Please note the late date of the November count. This is to avoid counting at the time of the full moon.

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